METHOD AND APPARATUS FOR TRUSS ROLLOUT

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TECHNICAL FIELD

[0002] This invention relates to a novel apparatus for use in the construction of buildings wherein a pre-fabricated truss must be moved to a selected location on a structure. Such apparatus is particularly well suited to the construction of residential structures or small commercial building structures which utilize prefabricated roof trusses.

BACKGROUND

[0003] When buildings which require the use of roof trusses are constructed, it is presently customary for the builder to purchase the necessary quantity of pre-fabricated roof trusses, and to have a package of such trusses delivered to one end of the structure on which the trusses are to be located. Since a package of trusses arrives bound together, it becomes necessary to

move trusses along the upper portion of a building structure until it is situated at a selected location at which it is secured to the then existing building structure. However, most trusses are quite heavy, and the working platform at which they need to be handled is high off of the ground, since the working platform is basically at the base elevation of the roof structure being completed. Thus, a rather dangerous working environment results, where significant loads are carried, repeatedly, while the workman maintains his or her balance along a working platform which may be quite narrow and which sometimes contains trip hazards such as uneven or ill fitting base lumber or the presence of hardware or fastener protrusions therefrom. Thus, it would be advantageous to provide an apparatus and method is designed to safely accommodate the need for truss movement, in order to avoid excess stress or strain on the workman, and which avoids or minimizes the dangers inherent in carrying a heavy load when high off of the ground.

[0004] Currently, there is a great but as yet unmet need for an apparatus and a system of moving roof truss sections that can easily meet restrictive ergonomic and/or safety regulations. In particular, it would be desirable to reduce the amount of time during which a workman is required to carry the load of, or a portion of, a roof truss. Additionally, an apparatus and method suitable for such a job could also find application for other services, to carry other heavy objects. Consequently, this disclosure provides description of a novel apparatus and method for carriage of prefabricated roof trusses along the top plate of a wall of a building under construction.

BRIEF DESCRIPTION OF THE DRAWING

[0005] In order to enable the reader to attain a more complete appreciation of the invention, and of the novel features and the advantages thereof, attention is directed to the following detailed description when considered in connection with the accompanying figures of the drawing, wherein:

[0006] FIG. 1 provides a front perspective view of one embodiment of a truss rolling apparatus and system as taught herein, showing a first horizontal beam, and spaced apart therefrom a second horizontal beam, having thereon a first truss carriage dolly and a second truss carriage dolly, respectively, and placed upon each of the first and second truss carriage dolly and spanning the distance therebetween, a prefabricated roof truss.

[0007] FIG. 2 provides a perspective view of one embodiment for a truss carriage dolly, showing first and second load bearing rollers rotatably affixed to spaced apart roller mounts, a load bearing base extending between the first and second roller mounts, and a load stop, against which a load accepting block is shown in phantom lines, ready for placement thereon the first end of a roof truss.

[0008] FIG. 3 is an exploded perspective view of one embodiment for a truss carriage dolly, showing first and second load bearing rollers rotatably affixed to spaced apart roller mounts, a load bearing base extending between the first and second roller mounts, and a load stop in the form of a small length L-shaped bar.

[0009] FIG. 4 provides an end view with a partial vertical cross-sectional view of one embodiment for a roof truss dolly as taught herein, showing a first load bearing roller rotatably affixed to spaced apart roller mounts, and where the roller mounts are each provided in the form of an upside down L-shaped frame having a flanged portion extending adjacent at least a portion of a beam on which the truss dolly is situated for service.

[0010] FIG. 5 provides a front perspective view of a second embodiment of a truss rolling apparatus and system as taught herein, showing a first horizontal beam, and spaced apart therefrom a second horizontal beam, having thereon a first truss carriage dolly a and a second truss carriage dolly, respectively, and placed upon each of the first and second truss carriage dolly and spanning the distance therebetween, a prefabricated roof truss, and additionally illustrating the use of an attachment link such as an eyebolt in size and shape for mating engagement with hook affixed to stick handle for moving the roof truss and pendulum combination from below.

[0011] FIG. 6 is an exploded perspective view of a second embodiment for a truss carriage dolly, showing first and second load bearing rollers rotatably affixed to spaced apart roller mounts, where the roller mounts are provided in the form of downwardly extending L-shaped frame portions, a load bearing base extending between the first and second roller mounts, and a load stop in the form of a small length upwardly protruding L-shaped bar.

[0012] FIG.7 provides an end view with a partial vertical cross-sectional view of a second embodiment for a roof truss dolly as taught herein, showing a

first load bearing roller rotatably affixed to spaced apart roller mounts, and where the roller mounts are each provided in the form of an upside down L-shaped frame having a flanged portion extending adjacent at least a portion of a beam on which the truss dolly is situated for service, and additionally showing the use of downwardly extending eye-bolts in size and shape for mating engagement with a hook affixed to a stick handle as indicated in FIGS. 5 and 10, for moving the roof truss from below.

[00013] FIG. 8 provides a bottom perspective view of another embodiment of a suitable roof truss dolly as taught herein, showing first and second load bearing rollers rotatably affixed to spaced apart roller mounts, and where the roller mounts are each provided in the form of outwardly oriented C-shaped frames having a downwardly extending sidewall portion sized for extending adjacent at least a portion of a beam on which the truss dolly is situated for service.

[0014] FIG. 9 provides a perspective view of the embodiment of a suitable roof truss dolly as just shown in FIG. 8, now additionally showing a first horizontal beam with a first truss carriage dolly thereon, and a prefabricated roof truss loaded on the truss carriage dolly

[0015] FIG. 10 provides a perspective view of a building under construction, illustrating the steps in a method of use of the truss carriage dolly, showing (1) a horizontal stack of prefabricated roof trusses that have been delivered to the roof, (2) a roof truss loaded on a pair of truss carriage dollies in the horizontal position, (3) the use of a linking system and handle for moving the

roof truss from below via pulling on the handle linked to the truss carriage dolly,, and (4) one roof truss already situated in a preselected location above the roof beam.

[0016] The foregoing figures, being merely exemplary, contain various elements that may be present or omitted from actual implementations and various configurations of a roof truss carriage dolly which may be used for a variety of building construction situations, depending upon the circumstances. An attempt has been made to draw the figures in a way that illustrates at least those elements that are significant for an understanding of the various embodiments and aspects of the invention. However, various other elements of the unique roof truss carriage dolly and the construction method for its use are also shown and briefly described to enable the reader to understand how various features, including optional or alternate features, may be utilized in order to provide a simple roof truss carriage system for use in building construction.

DETAILED DESCRIPTION

[0017] In many construction situations it would be advantageous to provide an apparatus and method which would enable safe, quick, and labor saving placement of prefabricated roof trusses at desired and preselected installation locations above the top plate a wall of a building under construction. Such an apparatus is provided in the each of the roof truss carriage dollies 20 illustrated in FIG. 1. First and second elongate beams 22 and 24 are provided, respectively, such as normally will be found running longitudinally along the upper reaches of a building under construction, normally the top plate of a wall 25 as shown in house 26 as seen in FIG. 10. Returning to FIG. 1, a typical off-site prefabricated roof truss 30 having a lower chord 32 and an upper chord 34 with first 36 and second 38 portions extending diagonally with respect to lower chord 32 to a peak 40 is provided. In FIG. 1, the truss 30 is shown with first end 42 and second end 44 loaded on support base 46 and 48 of first and second roof truss carriage dollies 20_1 and 20_2, respectively.

[0018] As seen in FIG. 2, at least one roller, and preferably two rollers 50 and 52 are provided, mounted in rolling configuration and extending between a first roller mount 54 and a second roller mount 56. Base 46 has a reverse side 60 (see FIG. 8), shown facing downward in FIG. 2 toward base mounting flanges 64 and 66 of first 54 and second 56 roller mounts. Note that while roller mounts 54 and 56 are a structural member of a generally L-shaped configuration as shown in FIG. 2, an alternate structural member in the form of a generally C-shaped configuration for roller mounts 54' and 56' is illustrated in FIGS. 8 and 9

for truss carriage dolly $20'_2$. The reverse side 60 of the base 46 has first 70 and second 72 opposing marginal portions, to which the base mounting flanges 64 and 66 of first 54 and second 56 roller mounts are securely affixed.

[0019] As more easily seen in the exploded views of FIGS. 3 and 6, a plurality of fasteners 80 having shaft portions 82 are provided for attachment of the roller mounts 54 and 56 to the base 46 (FIG. 3) or extended base 46' (see FIG. 6).

[0020] The upper or base mounting flange portions 64 and 66 of first 54 and second 56 roller mounts each include a plurality of fastener through apertures 84, wherein each fastener through aperture 84 is defined by an aperture edge wall portion 86. Base 46 or 46', in the form of a planar sheet with a thickness T_{46} of from about one eighth (1/8) of an inch to about three eighths (3/8) of an inch is provided. For enhanced strength, especially when smaller thicknesses are utilized for base 46, a first flanged lip 61 may be provided. Likewise, for enhanced strength, when base 46' is provided, a second flanged lip 63 can be provided. Base 46 or 46' has opposing first 70 and second 72 marginal portions sized and shaped, in one embodiment are provided for abutting mating engagement with the companion upper or base mounting flange portions 64 and 66 of the first and said second roller mounts 54 and 56. Each of the first and second marginal portions 70 and 72 have a plurality of base through apertures 90, wherein each base through aperture is defined by a base through aperture edge wall portion 92. As shown in FIG. 6, ten base through apertures 90 are provided in said support base 46', whereas in FIG. 3, eight base through

apertures 90 are provided. The shaft portions 82 of fasteners 80 are sized and shaped for fitting through one of the fastener through apertures 84 in the upper or base mounting flange portions 64 and 66 and through an axially aligned base through aperture 90, to secure the base 46 or 46' and the first roller mount 54 each toward the other, and to secure the base 46 or 46' and the second roller mount 56 each toward the other. As shown in FIGS. 3 or 6, fasteners can be threaded, and bolts are thus utilized with nuts 94 shaped for complementary tightenable engagement for securing the fasteners 80, however, any suitable fastener system, threaded or not, may be utilized as will be known to those of ordinary skill in the art and to whom this specification is addressed. Nuts 94 may be any suitable size to reflect the chosen fastener size. For example, larger fasteners 80' may be utilized where additional components are secured, such as cargo stop 130. And, as shown in FIGS. 6 and 7, an eyebolt 100 can be provided, and mounted by first nut with washer 104 and opposing nut 106.

[0021] To secure the truss carriage dolly 20_1 or 20_2 along elongate beams 22 and 24, respectively, (which beams are actually top plates for wall of the building under construction), the dolly 20_1 or 20_2 includes caging features such as flanges 110 and 112 in roller mounts 54 and 56. The caging features in one embodiment include such downwardly extending integrally provided flanges 110 and 112 which at least partially engage the elongate beam and thus serve to maintain the dolly 20_1 or 20_2 over the elongate beam 22 or 24 when the dolly is moved along the elongate beam. For simplicity, the first and second roller mounts 54 and 56 each form a structural frame member having integral flanged

portions 110 and 112 to thus provide a caging feature which protrudes a distance D_{112} as may be convenient in the circumstances; I have found a distance D_{112} of about one and one-quarter inches (1.25 inches) below the roller 50 or 52 is adequate in conventional wood frame construction.

[0022] Rollers 50 and 52 are rotatably secured between roller mounts 54 and 56. The rollers 50 and 52, in one embodiment, include a plastic outer beam contact surface. One suitable plastic for rollers 50 and 52 is ultra high molecular weight polyethylene which is made from recycled polyethylene, and in such cases, a solid plastic roller can be utilized. Alternately, a hollow or solid metal roller can be provided, such as a hollow steel roller. Each roller is attached to the roller mounts 54 and 56 via axle 114 and bearing 116. I have found it advantageous to utilize ball type bearings, which are supplied by Freeway Corporation of Cleveland, Ohio as model number ASF 132-1; however, any convenient combination of axle, roller and bearing can be utilized for supporting the anticipated load as will be calculable by those of ordinary skill in the art and to whom this specification is directed.

[0023] As illustrated, the truss carriage dolly 20_1 or 20 is provided with at least two contact points having rolling support relative to the elongate beam (22 or 24) being traversed. In one embodiment each of the at least two contact points having rolling support, in roller or wheel form. As illustrated, each of rollers 50 and 52 are of about one and one-half (1.5) inches in diameter, a size found useful for residential construction. The rollers 50 and 52 are, in some embodiments, provided in sizes from about four inches to about six and one-half

inches in width. For example, for use with two-inch by four-inch (2x4) framing, rollers are nominally sized at about four and one-quarter (4.25) inches in width. For two-inch by six-inch (2x6) framing, rollers are nominally sized at about six and one quarter (6.25) inches in width. I have also found it advantageous to space the axis of rotation 120 of rollers 50 and 52 apart from reverse side 60 of base 46 by a distance D120 of about one inch (see FIG. 4).

[0024] For ease in carriage of roof trusses, I have found it advantageous to provide a transversely oriented cargo stop 130 which is mounted on the base 46 or 46' oriented in a direction substantially parallel to the rollers 50 and 52. As illustrated, in one embodiment a cargo stop 130 is provided as an L-shaped angular metal component one (1) inch by one (1) inch by one-eighth (1/8) inch angle aluminum. Thicker parts may also be used. To reduce overall weight, in one embodiment, use of lightweight aluminum has been found advantageous for fabrication of the cargo stop 130, as well as roller mounts 54 and 64, and base 46 or 46'.

[0025] Turning now to FIGS. 9 and 10, a method is described for transporting and setting roof trusses using the truss carriage dolly just described herein above. In a building under construction, it is necessary to provide first and second spaced apart, substantially parallel elongated beams 22 and 24 (i.e., top plates of walls under construction), each having a substantially smooth upper surface 22_U and 24_U, respectively. A first rolling truss carriage dolly 20_1 is provided for engagement with, and rolling movement on, said first elongated beam 22. A second rolling truss carriage dolly 20_2 is provided for engagement

with, and rolling movement on, the second elongated beam 24. A plurality of off-site prefabricated truss units is provided, normally in a stack 140, which can be delivered in horizontal or vertical position to the building structure 26 by the supplier. Each truss unit 30 has an elongated lower chord 32 with first 42 and second 44 ends, and an upper chord 34. Then, the first 42 and second 44 ends are each lifted, either sequentially or simultaneously, and the weight of the truss 30 is transferred to the two truss carriage dollies. Once the truss 30 is loaded, it is moved, along with the truss carriage dollies, along the elongate beams 22 and 24 to a selected position adjacent a desired location for installation of the truss. Finally, the truss 30 is removed from the first and second truss carriage dollies.

[0026] As described above and as shown in various embodiments described herein, it may be useful to provide a truss carriage dolly having a rectangular base for support of one of the ends of a truss unit 30.

[0027] When a plurality of truss units 30 is provided, then the method is continued by returning the first and second truss carriage dollies to a location adjacent the plurality of trusses 140. Then, the process is repeated, where the first and second ends, sequentially or simultaneously, of a second one of a plurality of off-site factory prefabricated truss units are lifted and the weight transferred to one the first and second rolling truss carriage dollies. Then, the first and second rolling truss carriage dollies, and the second one of the prefabricated trusses 30 resting thereon, are moved to a selected position adjacent a desired location for installation of the second truss 30_2. The second truss is then removed from the first and second truss carriage dollies.

[0028] In one helpful embodiment, the truss carriage dolly further includes a downwardly protruding linking attachment member such as eyebolt 100. Then, a handle 204 is provided having a link member such as hook 206, complementary in size and shape for mating engagement with the linking attachment member of the truss carriage dolly, so that the towing handle 204 can be removably affixed to the truss carriage dolly. Then, the assembled combination of truss carriage dolly and said truss is manually moveable by a workman 208 with the handle.

[0029] In most applications, the truss units 30 have a generally triangular configuration with an elongated top chord 34 portions 36 and 38 arranged to extend diagonally with respect to the lower chord 32 to converge at a peak 40.

[0030] Although various aspects and elements of the invention are herein disclosed for illustrative purposes, it is to be understood that the roof truss carriage dolly, and the method of use of a pair of such roof truss carriage dollies in the construction of buildings, are important improvements in the state of the art of devices and methods for moving roof trusses or other heavy components. Although only a few exemplary aspects have been described in detail, various details are sufficiently set forth in the figures of the drawing and in the specification provided herein to enable one of ordinary skill in the art to make and use the invention(s), which need not be further described by additional writing in this detailed description. Importantly, the aspects and embodiments described and claimed herein may be modified from those shown without materially departing from the novel teachings and advantages provided as described

herein, and may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. It is especially pointed out that the size or rollers and the movement of rollers relative to a horizontal beam (i.e., top plate of a wall) therebelow, and the precise shape of the apparatus suitable for a specific situation, may vary widely based on the nature of the physical situation, such as the size of the beams being used for a base, and the components actually being handled. Therefore, the embodiments presented herein are to be considered in all respects as illustrative and not restrictive. As such, this disclosure is intended to cover the structures described herein and not only structural equivalents thereof, but also equivalent structures. Numerous modifications and variations are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention(s) may be practiced otherwise than as specifically described herein. Thus, the scope of the invention(s) is as described herein and as set forth in the appended claims, and as indicated by the drawing and by the foregoing description, is intended to include variations from the embodiments provided which are nevertheless described by the broad interpretation and range properly afforded to the plain meaning of the language of the claims set forth below.